

**Title:** Altering Student Mindsets

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**Describe the problem, issue, or area of interest and the context.**

A self-fulfilling prophecy is a prediction that, in being made, actually causes itself to become true. We, as mathematics instructors, witness this phenomenon in the students that believe they will never be good at mathematics. We see it in the students that “just want to pass with a ‘C’ ” because they do not find mathematics to be relevant to their lives. Further, we see it in the students that do not know how to study for a mathematics exam, so they don’t.

At two year colleges, students are most likely transitioning from high school to college level mathematics, where they suddenly have more responsibility for their own learning. It is at this point that these types of mindsets become more evident as an impediment to student learning.

This group has identified negative mindsets of Calculus students as a major roadblock to their success. Our goals for this project are to identify and challenge student mindsets that are likely to hinder learning, with an end result of increased student retention and success.

**Define your desired goals, or “outcomes.”**

1. Identify and challenge student mindsets that are likely to hinder learning
2. Increase student retention
3. Increase student success while maintaining academic rigor.

**Describe your “indicators” of success.**

1. A student survey was administered
2. The student retention rates were compared to those from previous semesters of the same course.
3. The student success rates were compared to those from previous semesters of the same course.

**Describe your project.**

This project had four components: a mathematical autobiography assignment, a research project, and two meetings with the instructor. First, the mathematical autobiography was assigned in the first week of class. The purpose of this assignment was to learn more about each student’s history with mathematics, beliefs concerning their ability in mathematics, reasons for taking the class, and future goals. The students had one week to complete this assignment and it was assessed with the rubric below.

Once the autobiographies were collected, each student was asked to schedule an individual 20-minute-long meeting with the instructor to discuss the content of the autobiography and choose a topic for their research paper. The instructor made a list of possible topics for each student in advance so that the student could choose from the list. The student was allowed to research a topic not on the list, as long as it was approved by the instructor. Some topics that were researched were:

- How to be successful in Calculus
- Working through math / test anxiety
- Applications of Calculus to your major
- Historic topics relating to Calculus
- The Golden Ratio
- Women in Mathematics
- Careers in Mathematics

After the students had worked on their research papers for six weeks, each student was asked to schedule a second 20-minute-long meeting with the instructor to discuss their progress in the course and on their research paper. At this point, students could receive individual assistance with their topic.

The research paper was to have a minimum of two cited sources and be three to five pages in length. Each paper was assessed with a rubric.

**Describe your results.**

The student success rates and student retention rates did not indicate that this project was effective. However, some members of the group plan to continue giving other sorts of writing assignments in the future.

**Describe your evaluation methods.**

The student success rates and student retention rates did not increase and in some cases they were worse.